

Many of the plants are large and the heads have unusually long rays.

ANTENNARIA PULVINATA Greene subsp. *ALBESCENS* E. Nels. Only a few specimens were found on some of the higher bars along the creek. This is a Rocky Mountain plant, the variety being known previously from Idaho but hitherto not from Oregon. It is easily recognizable by the strongly spreading, light brown involucre bracts as well as by the densely pulvinate habit, and the very small, rhombic-spatulate leaves.

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GENERIC NAMES OF ALGAE PROPOSED FOR CONSERVATION. I

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In the course of work on South African and other marine algae, it has been found that several old and well-established generic names are invalid. They are hereby proposed for conservation.

CHLOROPHYCOPHYTA

CLADOPHORA Kützing (Cladophoraceae), Phyc. general. 262. 1843.
versus

Annulina Link, in Nees von Esenbeck, Horae phys. berol. 4. 1820.

Type species: *Cladophora glomerata* (L.) Kütz.

Annulina Link (1820) is based upon seven species of which four, *Conferva glomerata*, *C. albida*, *C. nigricans*, and *C. rupestris*, and possibly a fifth, *C. rivularis*, are representative of *Cladophora* Kützing (1843). Of the two remaining entities, *Conferva sordida* is a species of *Conferva* Linnaeus (1753) and *C. compacta* is a species of *Urospora* Areschoug (1866), which name has been conserved.

Since *Cladophora* has been an accepted genus for more than a century, its conservation would probably be welcomed by most phycologists.

A name usually regarded as, in part, synonymous with *Cladophora* is *Chantransia* DeCandolle. This is owing to the belief that *Chantransia* was described for the first time by DeCandolle in the third edition of DeLamarek and DeCandolle's *Flore Française* (1805, vol. 2, p. 49); and as there conceived the genus included representatives of the green algal genera *Cladophora* and *Oedogonium* and the red algal genera *Batrachospermum* and *Lemanea*. In a recent paper it was pointed out by Pappenfuss (1945) that *Chantransia* could not properly replace either *Lemanea* or *Batrachospermum*. Of the two remaining genera, *Oedogonium* has already been conserved; and *Cladophora* is thus left as the only genus possibly requiring conservation against *Chantransia*.

Careful study of the text of DeCandolle has revealed that under *Chantransia vesicata* he had listed among other synonyms "*Chantransia nodosa* Decand. Bull. n. 51. p. 21." This clue led to the discovery that DeCandolle had actually described *Chantransia* four years previously in the third volume of the *Bulletin des Sciences de la Société Philomatique* (1801). In this publication, DeCandolle had referred only two species, *Conferva nodosa* Vauch. and *Chantransia nigricans* Decand., to his new genus. It has not been possible to ascertain the subsequent fate of *Chantransia nigricans*, but since DeCandolle excluded it from his genus as extended in the *Flore Française* (1805), it may be supposed that he regarded it as belonging elsewhere. This would leave *Chantransia nodosa* (= *Conferva nodosa* Vauch.) as the type of *Chantransia*; and inasmuch as this entity is a species of *Oedogonium*, viz., *O. vesicatum* (Vauch.) Wittr., *Chantransia* becomes synonymous with *Oedogonium*, which is a *nomen conservandum*.

PHAEOPHYCOPHYTA

ZONARIA Agardh (Dictyotaceae), Syn. alg. scand. p. xx. 1817.

versus

Zonaria Roussel, Fl. Calvados 99. 1806.

Type species: *Zonaria Tournefortii* (Lamour.) Mont.

As a genus of algae, *Zonaria* was apparently first described by Agardh in 1817 in his *Synopsis algarum scandinaviae*. From this and certain other early works, the impression is gained that the name was originally given by Draparnaud. Usually, the place of publication was not cited, but occasionally reference was made, sometimes with a query, to Draparnaud's (1801) *Discours sur les moeurs et la manière de vivre des plantes*. However, search through this and other works of Draparnaud has failed to reveal the epithet; and it seems safe to conclude that *Zonaria* was a manuscript name of Draparnaud which he had never published. Further support for this assumption is furnished by the fact that the binomials under *Zonaria* that are attributed to Draparnaud are usually cited as "ined." or "mscr." or with a query, while at least two of them, *Z. Pavonia* and *Z. squamaria*, are referred to by DeCandolle (in DeLamarck et DeCandolle, 1805, p. 17) as occurring in "Herb. Jussieu."

As a generic epithet, the name *Zonaria* seems to have been first published by Roussel (1806, p. 99). He applied it to a group of fungi, typified by "*Auricularia tremelloides* B." *Zonaria* Roussel has, however, not been taken up by mycologists, whereas *Zonaria* Agardh has for a long time received recognition among phycologists.

The conservation of *Zonaria* Ag. would automatically reduce *Villania*, which name was proposed by Nieuwland (1917) as a substitute for *Zonaria* Ag. Nieuwland's arguments for the rejec-

tion of *Zonaria* have been severely criticized by Setchell and Gardner (1925).

Recently, Tandy (1935) proposed *Zonaria* for conservation against *Villania*. As lectotype, he suggested *Z. variegata* (Lamour.) Ag. But J. Agardh had already, in 1894, made this species the basis of his genus *Gymnosorus*. The entity is now known as *Pocockiella variegata* (Lamour.) Papenfuss (1943).

In this connection, attention may also be drawn to *Chordaria divaricata*, which species Tandy (*loc. cit.*) has designated as the type of the genus *Chordaria* Ag. This species had previously been removed from *Chordaria* by both Kützing (1843) and J. Agardh (1880); and more recently Kylin (1940) made it the type of his new genus *Sphaerotrichia*. *Chordaria flagelliformis*, which Kylin (*op. cit.*) has selected as the type of *Chordaria*, would be a more appropriate choice for this purpose.

RHODOPHYCOPHYTA

As is apparent from a casual glance at the synonymy of certain species of *Lomentaria* Lyngbye (1819), *Chylocladia* Greville (*in* Hooker, 1833) and *Gastroclonium* Kützing (1843), there has existed in the past much confusion as to the exact limits of these genera, and transfers from one to the other have repeatedly been made. In addition, several other genera, such as *Champia*, *Laurencia*, and *Chondria*, have at times also been drawn into the confusion. This situation was not remedied until the appearance of Kylin's monograph of the Rhodymeniales. As delimited by Kylin (1931), these genera are comparatively easily separated.

If, however, the synonymy of *Lomentaria*, *Chylocladia*, and *Gastroclonium* is checked, it is found that these names are invalidated by epithets given by Stackhouse (1809) in his ill-fated "Tentamen marino-cryptogamicum," which was published in the second volume of the *Mémoires de la Société Impériale des naturalistes de Moscou*. As is known, this paper of Stackhouse embodies one of the earliest attempts towards a division of the Linnean genera, *Fucus*, *Ulva*, and *Conferva*, into a greater number of genera. But the work was overlooked for a long time with the result that most of Stackhouse's genera were never taken up.

In 1891, Kuntze revived a large number of generic names which had been forgotten, including several of those of Stackhouse (in some instances with slight modification of spelling). This restoration of old names by Kuntze was the prime factor responsible for the passage of rules governing the conservation of generic names by the International Botanical Congress.

In the list of *Nomina Generica Conservanda*, in the third (1935) edition of the "International Rules of Botanical Nomenclature," is included, among others, a number of names of algal genera

which have been conserved against names given by Stackhouse. Of the three genera mentioned above, viz., *Lomentaria*, *Chylocladia*, and *Gastroclonium*, only *Chylocladia* has been conserved, even though, as has been said, names given by Stackhouse invalidate all three.

Lomentaria Lyngb. has been typified by both Schmitz (1889) and Kylin (1931) with *L. articulata* (Huds.) Lyngb. and both these authors have also designated *Chylocladia kaliformis* (Good. and Woodw.) Grev. as the type of *Chylocladia* Grev. This species should, however, be known as:

Chylocladia verticillata (Lightf.) Papenfuss, comb. nov.
(= *Fucus verticillatus* Lightfoot, Fl. scot. 2: 962, pl. 31. 1777.
Fucus kaliformis Goodenough and Woodward, Trans. Linn. Soc. 3: 106, 206, pl. 18. 1797).

As the type of *Gastroclonium* Kütz., Kylin (1931) has chosen *G. ovale* (Huds.) Kütz., which species is now known as *G. ovatum* (Huds.) Papenfuss (1944).

Although the conservation of *Chylocladia* Grev. is highly desirable, in view of its invalidation by both *Kaliformis* Stackhouse (1809, as represented by *K. verticillatus*) and *Kalifornia* Stackhouse (1816, as represented by *K. verticillata* and *K. diaphana*), it is unfortunate that the name was conserved against *Sedoidea* Stackhouse (1809). This genus of Stackhouse is based on two entities, *S. purpurea* and *S. olivacea*, both of which are synonymous with *Gastroclonium ovatum*; and, as pointed out above, this species was designated as the type of *Gastroclonium* by Kylin in 1931. In its conservation of *Chylocladia* against *Sedoidea*, the committee on conservation was guided no doubt by the belief of Kuntze (1891) that these names were synonymous.

In addition to *Gastroclonium* and *Lomentaria*, the following genera of red algae have been found to require conservation: *Helminthora* J. Ag., *Laurencia* Lamour., *Catenella* Grev., *Gelidium* Lamour., *Pterocladia* J. Ag., *Chondria* Ag., *Plumaria* Schmitz, *Dasyphila* Sonder, and *Iridaea* Bory. All of them, with the exception of *Helminthora*, are invalidated wholly or in part by names given by Stackhouse.

HELMINTHORA J. Agardh (Helminthocladaceae), Sp. alg. 2(2): 415. 1852.

versus

Helminthora Fries, Syst. orb. veg. 1: 341. 1825; Corp. flor. prov. suecia. I. Flor. scan. 311. 1835.

Type species: *Helminthora divaricata* (Ag.) J. Ag.

Fries in 1825 erected a genus *Helminthora* without, however, referring any particular species to it until 1835, when he assigned to it *Rivularia multifida* Weber et Mohr. This species was subsequently found to belong to *Nemalion* Duby (1830).

The later homonym of *Helminthora* J. Agardh dates from 1852, and was proposed by J. Agardh for a genus belonging to the same family as *Nemalion*. Since that time *Helminthora* J. Ag. has become well established in algological literature.

In regard to *Nemalion*, it may be remarked that this genus is usually ascribed to Targioni-Tozzetti, who presumably published it in Bertoloni (1819, p. 300). From this work of Bertoloni, it is obvious, however, that Targioni-Tozzetti had used the name only in manuscript. Bertoloni described the entity in question as *Fucus Nemalion*. The genus *Nemalion* should consequently be accredited to Duby, who formally described it in 1830 (p. 959). In certain older works, the genus is, in fact, ascribed to Duby. The type species is *N. helminthoides* (Vellay) Batters (1902), which is an older name for *N. lubricum* Duby (*loc. cit.*).

GELIDIUM Lamouroux (Gelidiaceae), Essai 128. 1813.

versus

Cornea Stackhouse, Tent. mar.-crypt. 57. 1809, in part (as represented by *C. spinosa*, *op. cit.*, p. 83; *C. flicina*, *C. sericea*, *C. pusilla*, and *C. deformis*, *op. cit.*, p. 84).

Clavatula Stackhouse, Tent. mar.-crypt. 95, 97. 1809.

Kalifornia Stackhouse, Ner. brit., ed. 2, p. ix. 1816, in part (as represented by *K. pusilla*, *op. cit.*, pp. xii, 9, pl. 6).

Clavaria Stackhouse, Ner. brit., ed. 2, pp. x, xii, 23, pl. 12. 1816.

Type species: *Gelidium corneum* (Huds.) Lamour. (cf. Schmitz, 1889, p. 439).

PTEROCLADIA J. Agardh (Gelidiaceae), Sp. alg. 2(2): 482. 1852.

versus

Cornea Stackhouse, Tent. mar.-crypt. 57. 1809, in part (as represented by *C. capillacea*, *op. cit.*, p. 84).

Type species: *Pterocladia lucida* (Turn.) J. Ag.

CATENELLA Greville (Rhabdoniaceae), Alg. brit. pp. lxiii, 166, pl. 17. 1830.

versus

Kaliformis Stackhouse, Tent. mar.-crypt. 56. 1809, in part (as represented by *K. Opuntia*, *op. cit.*, p. 79).

Kalifornia Stackhouse, Ner. brit., ed. 2, p. ix. 1816, in part (as represented by *K. Opuntia*, *op. cit.*, pp. xii, 42, pl. 17).

Type species: *Catenella repens* (Lightf.) Batters (1902, p. 69), which is the valid name for *C. Opuntia* (Good. and Woodw.) Grev.

IRIDAEA [Iridea] Bory (Gigartinaceae), Dict. class. hist. nat. 9: 15. 1826; in Duperrey, Voy. autour du monde (Coquille), Botanique 2(1): 103. 1828.

versus

Iridea Stackhouse, Ner. brit., ed. 2, pp. ix, xii. 1816.

Mazzaella J. de Toni, Not. nomencl. alg. vii: [4], 1936 (May).

Iridophycus Setchell and Gardner, Proc. Nat. Acad. Sci. 22: 469, 1936 (August).

Type species: *Iridaea cordata* (Turn.) Bory.

When describing his genus *Iridaea*, in 1826, Bory pointed out that he used this name because the earlier *Iridea* of Stackhouse (1816), which was synonymous with *Desmarestia* Lamouroux (1813), could not be maintained. Originally, Bory spelled the name both as *Iridea* and as *Iridaea*, but later he (Bory, 1828) and others spelled it as *Iridaea*; and it is in this form that the name has come down to the present. Technically, both versions of the name are invalid, since *Iridea* is a later homonym of the genus of Stackhouse and *Iridaea* is an orthographic variant of *Iridea*.

The validity of *Iridaea* was not questioned until 1936, when Setchell and Gardner rejected it in favor of their newly erected *Iridophycus* on the grounds that (1) it was invalidated by *Iridea* Stackhouse, (2) the species, *Fucus edulis* Stackh., with which it was first typified by Greville (1830, p. 157) was the type of *Dilsea* Stackhouse (1809), and (3) the lectotype, *Fucus cordatus* Turn., of J. Agardh (1876) seemingly had been lost and was ". . . somewhat confused as to exact identity" (Setchell and Gardner, *op. cit.*, p. 470). Later, Setchell (1940) succeeded in tracing the type specimen of *Fucus cordatus* to the herbarium of the Royal Botanic Garden of Edinburgh; and a study of it revealed that it actually was a species of *Iridaea* or *Iridophycus*.

In recent times, some writers (Taylor, 1939; Smith, 1944) have accepted *Iridophycus* while others (Kylin, 1941; Skottsberg, 1941; Baardseth, 1941; Levring, 1944) have retained *Iridaea*.

Inasmuch as *Iridaea* Bory has been an accepted genus for a long time, it seems desirable to conserve it against the earlier *Iridea* of Stackhouse. Such action would be especially advantageous in view of the fact that Kylin (1941) has found that the type and only species of *Collinsia* J. Ag., *C. californica*, was a species of *Iridaea*. *Collinsia* had, however, previously been renamed *Mazzaella* by J. de Toni (May, 1936), and this name antedates *Iridophycus* Setchell and Gardner (August, 1936) by several months. Unless *Iridaea* were conserved, a comparatively large number of species would thus have to be transferred to the little-known *Mazzaella*.

LOMENTARIA Lyngbye (Champiaceae), Tent. hydrophyt. dan. 101, pl. 30, fig. A. 1819.

versus

Kaliformis Stackhouse, Tent. mar.-crypt. 56. 1809, in part (as represented by *K. articulatus*, *op. cit.*, p. 78).

Dasyphylla Stackhouse, Ner. brit. ed. 2, p. ix. 1816, in part (as represented by *D. articulata*, *op. cit.*, pp. xi, 14, pl. 8).

Type species: *Lomentaria articulata* (Huds.) Lyngb.

GASTROCLONIUM Kützing (Champiaceae), Phyc. general. 441. 1843.
versus

Sedoidea Stackhouse, Tent. mar.-crypt. 57, 83. 1809.

Dasyphylla Stackhouse, Ner. brit. ed. 2, p. ix. 1816, in part (as represented by *D. ovalis* and *D. sedoidis*, *op. cit.*, pp. xi, 25, pl. 12).

Type species: *Gastroclonium ovatum* (Huds.) Papenfuss (cf. Kylin, 1931, p. 30).

PLUMARIA Schmitz (Ceramiaceae), Kleinere Beitr. Kennt. Florid. vi, 5. 1896.

versus

Plumaria Stackhouse, Tent. mar.-crypt. 58, 86. 1809.

Type species: *Plumaria elegans* (Bonnem.) Schmitz (1889, p. 450).

Stackhouse, in 1809, founded a genus *Plumaria* upon two entities (at least as to synonymy), *Fucus plumosus* Hudson (1762, p. 473) and *F. pectinatus* Gunnerus (1772, p. 122), which he united under the name *Plumaria pectinata*.

Unaware of Stackhouse's genus, Agardh (1817, pp. xix, 39) established a genus *Ptilota* upon exactly the same two entities, which he united under the name *Ptilota plumosa*, and an additional variety β *Asplenioides* (= *Fucus Asplenioides* Turner = *Ptilota Asplenioides* (Turn.) Agardh).

Although both these genera are still accepted, and usually accredited to Stackhouse and Agardh, respectively, they have been the cause of much confusion.

Technically, *Ptilota* Ag. is invalid; and the species currently assigned to it should be referred to *Plumaria* Stackh., and a new generic name should be created for those species that are now placed in *Plumaria*. However, such action would probably aggravate the confusion instead of remedying it. Consequently, it seems best to retain *Ptilota* and to reject *Plumaria* Stackhouse in favor of *Plumaria* Schmitz. In 1896, Schmitz "amended" *Plumaria*; but in such a way that it had nothing but the name in common with the genus of Stackhouse. Although *Plumaria* Schmitz, like most old genera, originally contained certain species that belong elsewhere, it nonetheless includes a group of plants which is separable from *Ptilota* Ag. As now accepted, *Plumaria* is essentially the genus as it was understood by Schmitz, although the name is still accredited to Stackhouse. However, in a recent work, Kylin (1944) broke away from this long-established custom, and ascribed the genus to Schmitz.

DASYPHILA O. G. Sonder (Ceramiaceae), Bot. Zeit. 3: 53. 1845.
versus

Dasyphylla Stackhouse, Ner. brit. ed. 2, pp. ix, xi. 1816.

Type species: *Dasyphila Preissii* O. G. Sonder.

CHONDRIA Agardh (Rhodomelaceae), Syn. alg. scand. p. xviii. 1817.

versus

Kaliformis Stackhouse, Tent. mar.-crypt. 56. 1809, in part (as represented by *K. dasyphyllus*, *op. cit.*, p. 78).

Dasyphylla Stackhouse, Ner. brit., ed. 2, p. ix. 1816, in part (as represented by *D. Woodwardii*, *op. cit.*, pp. xi, 64, pl. 16; and *D. tenuissima*, *op. cit.*, pp. xii, 51, pl. 18).

Type species: *Chondria tenuissima* (Good. et Woodw.) Ag.

LAURENCIA Lamouroux (Rhodomelaceae), Essai 130. 1813.

versus

Osmundea Stackhouse, Tent. mar.-crypt. 56, 79. 1809.

Kaliformis Stackhouse, Tent. mar.-crypt. 56. 1809, in part (as represented by *K. obtusus*, *op. cit.*, p. 79).

Pinnatifida Stackhouse, Ner. brit. ed. 2, pp. ix, xii. 1816.

Type species: *Laurencia obtusa* (Huds.) Lamour. (cf. Schmitz, 1889).

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LITERATURE CITED

- AGARDH, C. A. 1817. Synopsis algarum scandinaviae. xl+135 pp. Lund.
- AGARDH, J. G. 1852. Species, genera et ordines algarum, 2 (2). 337-700 [+addenda, 701-720] pp. Lund.
- . 1876. Species, genera et ordines algarum, 3(1). Epicrisis systematicis floridearum. vii+724 pp. Lund.
- . 1880. Till algerne systematik, afd. 2. Lunds Univ. Årsskr. 17: 136 pp., 3 pls.
- . 1894. Analecta algologica, continuatio 1. Actis Soc. Physiogr. Lundensis 29: 144 pp., 2 pls.
- ARESCHOUG, J. E. 1866. Observationes phycologicae. I. Acta Reg. Soc. Sci. Upsalienses, Ser. 3, 6: 1-26, 4 pls.
- BAARDSETH, E. 1941. The marine algae of Tristan da Cunha. Results Norwegian Sci. Exp. Tristan da Cunha 1937-1938, No. 9. 174 pp., 75 figs. Oslo.
- BATTERS, E. A. L. 1902. A catalogue of the British marine algae. Jour. Bot. 40 (suppl.): 107 pp.
- BERTOLONI, A. 1819. Amoenitates italicae, . . . 472 pp., 6 pls. Bonn.
- BORY DE SAINT VINCENT, J. B. 1826. *Iridea*, Dict. Class. Hist. Nat. 9: 15-16.
- . 1828. Cryptogamia, in L. I. Duperrey, Voyage autour du monde . . . Coquille, 2(1). 301 pp. Paris.
- DECANDOLLE, A. P. 1801. Extrait d'un rapport sur les conferves. Bull. Sci. Soc. Philom. Paris 3(51): 17-21, 1 pl.
- DE TONI, J. 1936. Noterelle di nomenclatura algologica. vii. Primo elenco di Floridee omonime. [8] pp. Brescia.
- DRAPARNAUD, J. 1801. Discours sur les avantages de l'histoire naturelle, et discours sur les moeurs et la manière de vivre des plantes. 41 pp. Montpellier.
- DUBY, J. E. 1830. Botanicon gallicum . . . , ed. 2, 2. [2] + 545-1068 + i-lviii pp. Paris.
- FRIES, E. M. 1825. Systema orbis vegetabilis, pars I. Plantae homonemeae. vii+374 pp. Lund.
- . 1835. Corpus florum provincialium sueciae. I. Floram scanicam, xxiv+394 pp. Uppsala.

- GOODENOUGH, S., and T. J. WOODWARD. 1797. Observations on the British fuci, with particular descriptions of each species. *Trans. Linn. Soc. London* 3: 84-235, 4 pls.
- GREVILLE, R. K. 1830. *Algae britannicae*. lxxxviii+218 pp., 19 pls. Edinburgh.
- GUNNERUS, J. E. 1772. *Flora norvegica*, 2. [4]+viii+148+[60] pp., 9 pls. Copenhagen.
- HOOKE, W. J. 1833. *The English flora of Sir James Edward Smith* 5(1). x+432 pp. London.
- HUDSON, G. 1762. *Flora anglica*, ed. I. viii+[8]+506+[22] pp. London.
- KUNTZE, O. 1891. *Revisio generum plantarum*, . . . , 1. clv+[1]+1011 pp. Leipzig, etc.
- KÜTZING, F. T. 1843. *Phycologia generalis*. xvi+458+[1] pp., 80 pls. Leipzig.
- KYLIN, H. 1931. *Die Florideenordnung Rhodymeniales*. *Lunds Univ. Årsskr.* N. F. Avd. 2, 27(11). 48 pp., 8 figs., 20 pls.
- . 1940. *Die Phaeophyceenordnung Chordariales*. *Ibid.* 36(9). 67 pp., 30 figs., 8 pls.
- . 1941. *Californische Rhodophyceen*. *Ibid.* 37(2). 51 pp., 7 figs., 13 pls.
- . 1944. *Die Rhodophyceen der schwedischen Westküste*. *Ibid.* 40(2). 104 pp., 53 figs., 32 pls.
- LAMARCK, J. B. DE, and A. P. DECANOLLE. 1805. *Flore française*, ed. 3, 2. xii+600 pp., map. Paris.
- LAMOUREUX, J. V. F. 1813. *Essai sur les genres de la famille des thalassiophytes non articulées*. *Ann. Mus. Hist. Nat. Paris* 20: 21-47, 115-139, 267-293, 7 pls.
- LEVING, T. 1944. *Meeresalgen von den Crozet-Inseln und Kerguelen*. *Arkiv. f. Bot.* 31A(8). 31 pp., 19 figs.
- LIGHTFOOT, J. 1777. *Flora scotica* 2: 531-1151+[24] pp., 12 pls. London.
- LINK, H. F. 1820. *Epistola . . . de algis aquaticis in genera disponendis scripsit, in C. G. D. Nees von Esenbeck, Horae physicae berolinenses*, . . . , No. I. 8 pp., 1 pl. Bonn.
- LINNAEUS, C. 1753. *Species plantarum*, 2: 561-1200+[31] pp. Stockholm.
- LYNGBYE, H. C. 1819. *Tentamen hydrophytologiae danicae*. xxxii+248 pp., 70 pls. Copenhagen.
- NIEUWLAND, J. A. 1917. *Critical notes on new and old genera of plants*. X. *Am. Midl. Naturalist* 5: 50-52.
- PAPENFUSS, G. F. 1943. *Notes on algal nomenclature*. II. *Gymnosorus* J. Agardh. *Am. Jour. Bot.* 30: 463-468, 15 figs.
- . 1944. *Notes on algal nomenclature*. III. *Miscellaneous species of Chlorophyceae, Phaeophyceae and Rhodophyceae*. *Farlowia* 1: 337-346.
- . 1945. *Review of the *Acrochaetium-Rhodochorton* complex of the red algae*. *Univ. Calif. Publ. Bot.* 18(14): 299-334.
- ROUSSEL, H. F. A. 1806. *Flore du Calvados et des terrains adjacens*, . . . , ed. 2. 371+[1] pp. Caen.
- SCHMITZ, F. 1889. *Systematische Übersicht der bisher bekannten Gattungen der Florideen*. *Flora* 72: 435-456.
- . 1896. *Kleinere Beiträge zur Kenntniss der Florideen*. VI. *Nuova Not.* 7: 1-22.
- SETCHELL, W. A. 1940. *Fucus cordatus* Turner. *Proc. Nat. Acad. Sci.* 26: 643-651, 2 figs.
- SETCHELL, W. A., and N. L. GARDNER. 1925. *The marine algae of the Pacific coast of North America*. *Univ. Calif. Publ. Bot.* 8(3): 383-898, incl. 73 pls.
- . 1936. *Iridophycus* gen. nov. and its representation in South America. *Proc. Nat. Acad. Sci.* 22: 469-473.
- SKOTTSBERG, C. 1941. *Communities of marine algae in subantarctic and antarctic waters*. *Kungl. Svenska Vetenskapsakad. Handl. Ser. 3*, 19(4). 92 pp., 7 figs., 3 pls.

- SMITH, G. M. 1944. Marine algae of the Monterey Peninsula. vii + [1] + 622 pp., incl. 98 pls.
- SONDER, O. G. 1845. Nova algarum genera et species, quas in itinere ad oras occidentales Novae Hollandiae, collegit L. Preiss, Ph.Dr. Bot. Zeit. 3: 49-57.
- STACKHOUSE, J. 1809. Tentamen marino-cryptogamicum, . . . Mem. Soc. Imp. Nat. Moscou, 2: 50-97.
- . 1816. Nereis britannica, ed. 2. xii + 68 pp., 20 pls. Oxford.
- TANDY, G. 1935. Additions and amendments to the international rules of botanical nomenclature, ed. 3. Appendix III. 1. Algae. Kew Bull. 1935: 82-83.
- TAYLOR, W. R. 1939. Algae collected by the "Hassler," "Albatross," and Schmitt Expeditions. II. Marine algae from Uruguay, Argentina, the Falkland Islands, and the Strait of Magellan. Papers Michigan Acad. Sci., Arts and Letters 24: 127-164, 7 pls.

GERMINATION OF PHACELIA SEEDS

CLARENCE R. QUICK

In the fall of 1942 the writer made some tests on the germinative reactions of *Phacelia* seeds. This work was carried on to facilitate cyto-taxonomic studies in *Phacelia* being carried on by Dr. Marion S. Cave and Dr. Lincoln Constance of the Department of Botany, University of California, Berkeley, which have culminated in the publication of three papers on chromosome numbers in the Hydrophyllaceae (Univ. Calif. Publ. Bot. 18: 205-216. 1942; 18: 293-298. 1944; in press). The methods used were based upon previous experience in the germination of seeds of *Ribes* and *Ceanothus*, and of other plants native to California. *Ribes* seeds, which are similar to those of *Phacelia* in size, appearance, and ecologic relationships, have been studied extensively by the writer during the past fifteen years.

Quick (1935) showed that germinative reactions of *Ceanothus* species vary widely, and that variations tend to correlate with the ecologic and taxonomic affinities of species and groups of species concerned. Mirov (1936) summarized the results of a large number of germination tests on seeds of native California plants with respect to taxonomic position, altitudinal distribution, and growth form of the species concerned. In general he found no consistent relation between systematic position and germinative behavior, but he did find definite correlations between germinative behavior and altitudinal distribution. He found that failure of germination due to seed-coat dormancy was more common in plants from low altitudes, and that failure due to embryo dormancy was more often encountered in plants from high altitudes. Seeds of annuals were less generally dormant than seeds of herbaceous perennials, shrubs, and trees.

The low germination percentages for some samples of *Phacelia* seeds, as reported by Mirov (1940) and Mirov and Kraebel (1937), suggested that stratification might be necessary to satis-